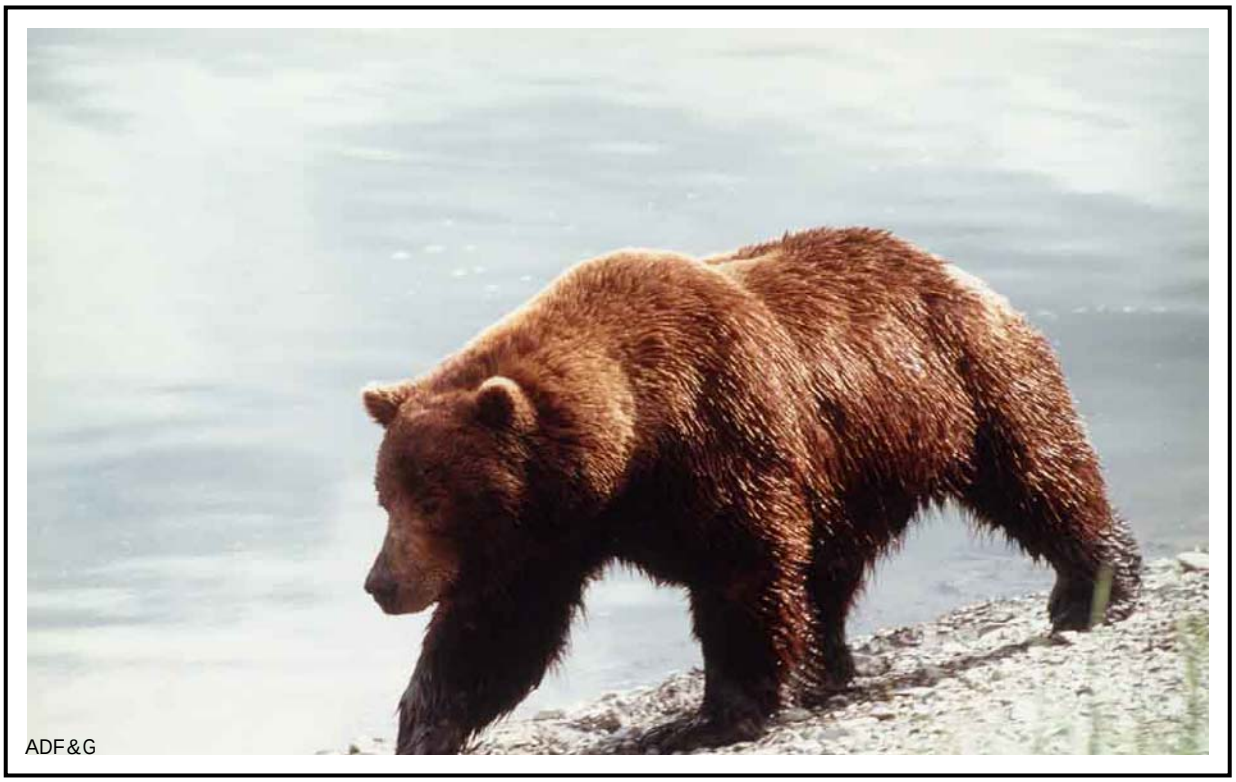
Brown Bear
Management Report
of survey-inventory activities
1 July 1998–30 June 2000

Carole Healy, Editor
Alaska Department of Fish and Game
Division of Wildlife Conservation
December 2001



Please note that population and harvest data in this report are estimates and may be refined at a later date.

If this report is used in its entirety, please reference as: Alaska Department of Fish and Game. 2001. Brown bear management report of survey-inventory activities 1 July 1998–30 June 2000. C. Healy, editor. Project 4.0. Juneau, Alaska. 324 p.

If used in part, the reference would include the author's name, unit number, and page numbers. Authors' names can be found at the end of each unit section.

Funded in part through Federal Aid in Wildlife Restoration, Proj. 4, Grants W-27-2 and W-27-3.

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BROWN BEAR MANAGEMENT REPORT

From: 1 July 1998
To: 30 June 2000

LOCATION

GAME MANAGEMENT UNIT: 1 (18,500 mi^2)

GEOGRAPHIC DESCRIPTION: The Southeast Alaska mainland from Dixon Entrance to Cape Fairweather, and those islands east of Clarence Strait from Dixon Entrance to Caamano Point, and all islands in Stephens Passage and Lynn Canal north of Taku Inlet.

BACKGROUND

Southeast Alaska brown bears inhabit the islands north of Frederick Sound and the coastal mainland; however, until recently they were only known to coexist with black bears on mainland portions of the panhandle. During recent years there have been a number of reports of brown bears on islands in Units 1A, 1D, and 3. Although extensive brown bear research has been carried out on Admiralty and Chichagof islands in Unit 4 (Schoen and Beier 1989, Titus and Beier 1993), no brown bear research has been undertaken on Southeast Alaska's mainland. Most of the information we use to assess and manage mainland brown bear populations has come from anecdotal hunter information, pilot and staff observations, registration permit hunt reports, and mandatory sealing data.

Brown bear sealing requirements have been in effect in Alaska since 1961. Hunters have been required to obtain registration permits before hunting brown bears in Unit 1 since 1989 (McCarthy 1991, Larsen 1993). Before 1989 hunters were only required to obtain a license and metal-locking tag prior to hunting.

Generally about half of the unit's annual brown bear harvest comes from Unit 1D (Haines area), located in the northern part of the region. Units 1A (Ketchikan area), 1B (Petersburg area), and 1C (Douglas area) each account for 5–40% of the annual harvest. Nonresident hunters are required to hunt brown bears with a registered guide or a relative within the second degree of kindred. Because of brown bears' trophy status and because hunters must wait 4 seasons between hunts, hunters (especially residents) often do not select small bears but wait to harvest a large bear. This partly accounts for the relative low success rates noted for resident hunters in Southeast Alaska.

The Tongass National Forest (Tongass) encompasses most Unit 1 brown bear habitat, excluding intertidal and Unit 1D state lands, municipal lands, and Native Corporation lands, and is

managed under a multiple-use concept. The Misty Fiords National Monument within the Tongass on the southern Unit 1 mainland contains large tracts of healthy bear habitat.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

- Maintain an average age of harvested males no less than 6.5 years, and a male to female harvest ratio of at least 3:2.

- Reduce the number of bears killed because of garbage habituation.

METHODS

Unit 1 brown bear hunters are required to obtain registration permits prior to hunting. From the hunt report we obtain useful information about hunting effort, dates afield, and unsuccessful hunt and/or kill locations. We also collect brown bear harvest data through a mandatory-sealing program. During sealing we record the sex of harvested bears along with the hunt date and kill location. We also measure bear skulls and extract a premolar tooth. At the end of each season, we send all extracted premolars to Matson's Laboratory (Bozeman, Montana USA) for aging.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Quantitative population data are not available for Unit 1 brown bears. Based on anecdotal hunter reports, department staff observations, pilot observations, and sealing records, we believe the population remained stable during this report period.

MORTALITY

Harvest

Season and Bag Limit	Resident and Nonresident Hunters
1 bear every 4 regulatory years by registration permit only	15 Sep–31 Dec 15 Mar–31 May

Forest Service Moratorium for Nonresident Hunters. The number of successful nonresident brown bear hunters in Southeast Alaska has increased considerably, raising concerns about sustainable harvest levels. A US Forest Service (FS) moratorium issued in summer 2000 limits the level of Unit 4 guide activity. Over the past 10 years the number of active Unit 4 big game guides quadrupled. Because the state has no authority to limit guides, the FS, at the request of the Alaska Department of Fish and Game (ADF&G), restricted Unit 4 guides to the average of their 1997 and 1998 client levels. At the time the Unit 4 Brown Bear Management Team (Team) was created in January 1999, the likelihood of a "domino effect" was identified, redirecting hunting pressure elsewhere should any Unit 4 restrictions be put in place. This became a reality in Unit 1 with an increased effort and higher harvest immediately after the Unit 4 moratorium went into effect. Beginning in spring 2001, guides operating under FS special use permits will be limited by the number of hunts they conduct annually in Unit 1.

The Unit 1 brown bear harvest by nonresident hunters increased 23% during the past 10 years while resident success declined by 16%. Twenty-five bears taken by nonresidents during 1999 represented 63% of the unit's harvest, and the 1999 total harvest of 40 bears was 33% higher than the 10-year average. With no authority to regulate guides, ADF&G's only options to reduce harvest is to change the season or bag limits, use a drawing permit, or close a season by emergency order. At the request of ADF&G, the FS agreed to limit the number of guided brown bear hunts in Units 1. ADF&G provided recommendations, population estimates, and historical harvest data to help determine the number of guided hunts each subunit could sustain. Population estimates were based on available bear habitat and brown bear density estimates from Admiralty and Chichagof islands in Unit 4 where research has been conducted (Schoen and Beier 1989, Titus and Beier 1993). Although the Unit 1 density estimates are crude they provide a baseline for conservative management until more accurate information becomes available. Beginning January 2001, Unit 1 brown bear guides will be held to the mean of the 1998 and 1999 FS special-use permits they were issued.

A recent brown bear moratorium in British Columbia has halted all brown bear hunting for the 2001–2004 period. Guided hunters displaced from that closure may show interest in Alaska as one of the few places now available in the world to hunt brown bears.

Hunter Harvest. The 1999 Unit 1 brown bear harvest was unusually high in many respects. The unit-wide harvest of 40 bears, including 13 from Unit 1A, is the highest ever (Table 1). The 1999 harvest also consisted of 42% female bears, the highest female proportion in over 10 years (Table 2). The mean female skull size ($\bar{x}$ = 19.4 inches, n=16) was also one of the smallest on record (Table 3). Unit 1D continued to account for the highest proportion of Unit 1 bears during the report period (1998–99), 52% and 37% respectively. During this 2-year report period the proportion of bears killed by subunit (1A, B, C, and D) was 25%, 17%, 13%, and 44%, respectively. Unit 1B historically has the second highest harvest, however during this report period it dropped to third behind Unit 1A. The 15-year Unit 1 harvest proportion by subunit (1A–1D) has been 18%, 19%, 16%, and 47%, respectively.

During the past 15 years, the average number of bears harvested has remained evenly split between spring and fall ($\bar{x}$ = 14) although spring harvests have historically been skewed toward males. We suspect this is partly because it is illegal to harvest females accompanied by cubs. As sows with second-year cubs separate at the end of spring seasons, sows become legal to hunters, and the proportion of females in the harvest increases substantially during fall. During the past 10 years the fall harvest of female bears has comprised just under ½ of the total ($\bar{x}$ = 47%). The spring harvest of female bears during the same period has consistently been much lower ($\bar{x}$ = 18%). For the first time since registration hunts began in 1985 our management objective of 60% male bears in the harvest was not reached during spring 2000 (Table 2). Male bears comprised 41% (n = 9) of the spring harvest that year and our male to female ratio harvest objective was not met (Table 2). A new Unit 1A guide was responsible for 4 bears in spring 2000, including 3 small females. This guide was not authorized to operate under FS special-use permits in Unit 1 for spring 2001.

The 1998 mean male skull size ($\bar{x}$ = 22.8, n= 24) was slightly above the long-term average ($\bar{x}$ = 22.2), while the 1999 male average ($\bar{x}$ = 21.7, n= 26) was slightly lower. The average female skull sizes during 1998 (19.7, n= 13) and 1999 (19.4, n= 16) were lower than the long-term

average (20.2 inches). The 1999 female mean skull size was also the second lowest on record, and well below the long-term average (Table 3).

The 1998 mean age of harvested male bears (7.9, n= 24) was similar to past years and is well within our objective of 6.5 years. The 1998 mean female age was 5.4 years, (n= 10), the lowest since 1993 and well below the long-term average of 7.4 years. Ages were not yet available from the 1999 harvest for this report.

Permit Hunts. Registration permits have been required for Unit 1 brown bear hunters since fall 1989. During the 1998 and 1999 seasons, 303 and 343 registration permits were issued, respectively. Consistent with the long-term average about 50% of those hunters who registered hunted, and 12% of those hunting were successful (Table 4). Compliance with permit conditions has been excellent during the past several seasons, although it has required post-season effort reminding delinquent hunters to provide required hunt information. Only 1 hunter during each of the 2 most recent seasons failed to file a hunt report.

Hunter Success and Residency. Of the 147 hunters afield in 1998-1999, 24% were successful, and during 1999-2000 a total of 171 hunters went afield with a 23% success rate. Hunter success rates for fall (26%) and spring (25%) were higher during this report period than the 10-year average.

During 1998-1999 nonresidents harvested 14 bears, compared with 25 during 1999-2000. The latter is the first year that nonresidents took more bears than residents (Table 5). The 25 bears taken by nonresidents during 1999 represents 63% of the total Unit 1 harvest. We attribute this in part to a recent increase in big game guiding in the unit. This increasing trend in guided hunters has been a concern for several years (Porter 1998). During the past 15 years there has been a declining trend in the success of Alaska residents and an increasing trend in successful nonresidents. One explanation is that resident hunters are more selective when choosing a bear, and consequently may pass over smaller bears due to the 1 bear every 4 years regulation.

Successful hunters spent 3.4 and 3.2 days to harvest a bear during the 1998 and 1999 seasons, respectively, compared to the 10-year average of 4.3 days (range 2.9–6.6 days). Unsuccessful resident hunters spent an average of 4.3 days hunting during each year of the report period. Unsuccessful nonresidents reported an average of 8.7 hunting days in 1998 and 7.1 days hunting bears during 1999.

Harvest Chronology. The greatest number of bears are available to hunters late in the spring season because most have left their dens and are seeking food. During this period most available food, primarily grasses and sedges, is found at the edge of saltwater where bears concentrate. This makes the majority of the bear population available during a short period to hunters using boats. During most of the past 15 seasons, the Unit 1 brown bear harvest has been somewhat evenly split between fall and spring seasons (Table 6). The majority of brown bears harvested from the unit have historically been taken during May ($\bar{x}$ = 13), with the month of September consistently being the second highest annual harvest period ($\bar{x}$ = 7), accounting for most fall bears (Table 7).

Transport Methods. Most Unit 1 brown bear hunters continue to use boats to access remote, mostly roadless hunting areas. We recorded the highest boat use ever during the 1998 season (83%). During the past 15 years, boat use has accounted for an average of 65% of the reported transport methods (Table 8). Highway vehicles (17%), aircraft (6%), and ORVs (5%) are used much less frequently. The only Unit 1 area with highway access is near Haines in Unit 1D.

Other Mortality

We derived the total estimated human-caused mortality for Unit 1 by adding the reported harvest, defense of life or property (DLP) kills, and known and estimated unreported/illegal harvests (Table 2). Other mortality included in the nonhunting category was either research related or from other known human/caused accidental mortalities. Unreported harvests or illegal kills are reported separately. Unreported kills are estimated at 10% of the reported harvest, although this is considered a conservative estimate (McCarthy 1991) (Table 2). In 1998, 3 male and 2 female bears were reported as DLP kills, and in 1999 four males and 2 females were in that category. When these other sources of dead bears are added to the legal Unit 1 harvest the total human-caused mortality equaled 40 bears in 1998 and 46 bears in 1999. During the previous report period (1996–1998), the nonhunting related mortality was significantly lower and conformed to our management objective of reducing bear/human conflicts (Porter 1998).

A total of 7 bears were killed in fall 1999 and another 5 bears in spring 2000 under DLP terms. One had eaten chickens, one attacked a dog, 6 were killed because residents felt the bears were too close and posed safety threats, and a sow and cub were killed by a big game guide when his hunting party was charged. Better reporting and documentation of DLP kills could explain some of the increase. Not all bears killed are reported or sealed, and some DLP mortalities occur during the regular hunting season and are tagged and sealed as harvested bears. This can give an artificially low estimate of the number of bears killed via DLP provisions. Efforts are now being made to provide better public awareness and education in some of the problem areas to reduce the level of nonhunting mortality.

HABITAT

Assessment

As noted above, most of Unit 1 has healthy brown bear habitats, primarily under FS jurisdiction. Within the unit there is a highway accessible area closed to bear hunting to enhance viewing opportunities, at the Hyder Salmon River Closed Area. Timber harvest, mineral exploration, and other developments pose the most serious threats to brown bear habitat in Unit 1. Although this has been especially true in Units 1B and C, future timber harvest scheduled for the Cleveland Peninsula in Unit 1A will similarly affect bear habitat. Bear/human interactions and conflicts resulting from increased access and development continue to be areas of concern. DLP mortalities are an ever-present possibility where bears become attracted and accustomed to garbage dumps created by new logging and mining camps, or around villages and towns with open dumps.

CONCLUSIONS AND RECOMMENDATIONS

The Unit 1 registration permit hunt initiated in 1989 continues to provide useful information about brown bear hunting effort and success. Hunters continue to use boats as the primary mode

of transportation since this allows them access into much of the unit's roadless areas. Our 3:2 male to female harvest ratio objective was not met during 1999. Due to the existing high number of female bears in fall harvests, it is essential that any future management actions avoid placing additional pressure on females. For the same reason ADF&G supported the Unit 4 Brown Bear Management Team's recommendations, we feel confident that changes in the FS Special-Use Permit system will provide a degree of control over the growing nonresident brown bear harvest.

The harvest objective of maintaining an average age of 6.5 years for male bears was met during both 1998 and 1999. Male bear ages have exceeded the harvest objective in 14 of the past 15 seasons. Female bears accounted for 63% of the 1998 spring harvest, the highest female proportion since 1986. Over 50% of the total 1998 harvest were taken during spring, similar to the 15-year average. Spring and fall hunter success also remained similar during the 1999 season (Table 6).

The recent trend in DLP bear mortality shows a marked increase from previous years and did not meet our objective of reducing the number of bears killed because of garbage habituation. Most of the solution for reducing bear/human conflicts depends upon the willingness of the public, municipalities, and timber and mining industries to adopt and adhere to responsible garbage management practices. An open landfill was recently closed near Haines while other communities such as Hyder still have open pits allowing bears access to garbage. Until areas like Hyder address the issue of landfills, garbage will continue to be a problem and bring bears in direct conflict with humans.

Based on harvest data, staff observations, and reports by the public, we could not determine any change in the Unit 1 brown bear population during this report period. We see no reason to modify the season or bag limit at this time.

LITERATURE CITED

LARSEN, D. N. 1993. Unit 1 brown bear survey–inventory management report. Pages 1–14 *in* S. M. Abbott, ed. Alaska Dep. Fish and Game, Div. Wildl. Cons. Fed. Aid in Wildl. Rest. Proj. W–23–4 and W–23–5, Study 4.0. Juneau. 283pp.

MCCARTHY, T. M. 1991. Unit 1 brown bear survey–inventory management report. Pages 1–11 *in* S. M. Abbott, ed. Alaska Dep. Fish and Game, Div. Wildl. Cons. Fed. Aid in Wildl. Rest. Proj. W–23–3 and W–23–4, Study 4.0. Juneau. 271pp.

PORTER, B 1999. Unit 1 brown bear survey–inventory management report. Pages 1–15 *in* S. M. Abbott, ed. Alaska Dep. Fish and Game, Div. Wildl. Cons. Fed. Aid in Wildl. Rest. Proj. W–24–5 and W–27–1, Study 4.0. Juneau. 306pp.

SCHOEN, J. W., AND L. R. BEIER. 1989. Brown bear habitat preferences and brown bear logging and mining relationships in Southeast Alaska. Alaska Dep. Fish and Game. Fed Aid in Wildl. Rest. Proj. Rep. Proj. W–23–1, Study 4.17. Juneau. 32pp.

TITUS, K., AND L. R. BEIER. 1993. Population and habitat ecology of brown bears on Admiralty and Chichagof Islands. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Research Rep. Proj. W–24–1. Juneau. 40pp.

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Table 1 Unit 1 brown bear harvests, 1985–1999[a]

Regulatory	Unit 1A		Unit 1B		Unit 1C		Unit 1D		Total
year	Harvest	% of total	Harvest	% of total	Harvest	% of total	Harvest	% of total	harvest
1985-1986	1	(4)	7	(30)	6	(26)	9	(39)	23
1986-1987	2	(13)	2	(13)	5	(33)	6	(40)	15
1987-1988	8	(24)	4	(12)	3	(9)	18	(55)	33
1988-1989	4	(25)	2	(12)	3	(19)	7	(44)	16
1989-1990	4	(20)	4	(20)	1	(5)	11	(55)	20
1990-1991	5	(19)	5	(18)	4	(15)	13	(48)	27
1991-1992	4	(15)	6	(24)	4	(15)	12	(46)	26
1992-1993	7	(19)	8	(21)	4	(11)	18	(49)	37
1993-1994	4	(17)	3	(12)	6	(25)	11	(46)	24
1994-1995	8	(28)	5	(17)	3	(10)	13	(45)	29
1995-1996	3	(15)	8	(40)	1	(5)	8	(40)	20
1996-1997	4	(13)	4	(13)	7	(22)	16	(52)	31
1997-1998	5	(14)	4	(12)	5	(14)	21	(60)	35
1998-1999	6	(17)	7	(20)	4	(11)	18	(52)	35
1999-2000	13	(33)	6	(15)	6	(15)	15	(37)	40
$\bar{x}$	5	(18)	5	(19)	4	(16)	13	(47)	27

[a] Does not include bears killed in defense of life or property, research mortalities, illegal harvests, or other human/caused accidental mortalities.

Table 2 Unit 1 brown bear harvest, 1985–1999

Regulatory year	Reported							Estimated kill				
	Hunter kill				Nonhunting kill[a]			Unreported illegal[b]	Total estimated kill			
	M (%)	F (%)	Unk.	Total	M	F	Unk.		M (%)	F (%)	Unk.	Total
Fall 1985	(30)	(70)	1	11	3	0	0	1	(46)	(54)	2	15
Spring 1986	(82)	(18)	1	12	1	0	0	1	(83)	(17)	2	14
Total	(57)	(43)	2	23	4	0	0	2	(64)	(36)	4	29
Fall 1986	(40)	(60)	0	10	0	0	0	1	(40)	(60)	1	11
Spring 1987	(80)	(20)	0	5	0	0	0	1	(80)	(20)	1	6
Total	(53)	(47)	0	15	0	0	0	2	(53)	(47)	2	17
Fall 1987	(73)	(27)	2	17	0	0	0	2	(73)	(27)	4	19
Spring 1988	(53)	(47)	1	16	1	0	0	1	(56)	(44)	2	18
Total	(63)	(37)	3	33	1	0	0	3	(67)	(33)	6	37
Fall 1988	(60)	(40)	0	5	1	1	0	1	(67)	(33)	1	8
Spring 1989	(82)	(18)	0	11	0	0	0	1	(82)	(18)	1	12
Total	(75)	(25)	0	16	1	1	0	2	(72)	(28)	2	20
Fall 1989[c]	(67)	(33)	1	10	0	0	0	1	(67)	(33)	2	11
Spring 1990	(80)	(20)	0	10	0	1	0	1	(73)	(27)	1	12
Total	(74)	(26)	1	20	0	1	0	2	(70)	(30)	3	23
Fall 1990	(72)	(28)	0	18	1	1	2	2	(75)	(25)	2	24
Spring 1991	(100)	(0)	0	9	0	0	0	1	(100)	(0)	1	10
Total	(81)	(19)	0	27	1	1	2	3	(79)	(21)	3	34
Fall 1991	(50)	(50)	0	12	1	1	0	1	(50)	(50)	0	15
Spring 1992	(78)	(22)	0	14	0	0	0	1	(78)	(22)	0	15
Total	(65)	(35)	0	26	1	1	0	2	(64)	(36)	0	30
Fall 1992	(52)	(48)	0	25	0	0	0	3[d]	(52)	(48)	0	28
Spring 1993	(91)	(09)	0	12	4	0	0	1	(94)	(06)	0	17
Total	(64)	(36)	0	37	4	0	0	4	(62)	(38)	0	45
Fall 1993	(75)	(25)	0	12	1	0	0	1	(77)	(25)	0	14
Spring 1994	(75)	(25)	0	12	0	0	0	2[e]	(75)	(25)	0	13
Total	(75)	(25)	0	24	1	0	0	2	(76)	(24)	0	27
Fall 1994	(42)	(58)	0	12	0	1	0	2[f]	(40)	(60)	0	15
Spring 1995	(76)	(24)	0	17	0	0	0	2	(74)	(26)	0	19
Total	(62)	(38)	0	29	0	1	0	4	(59)	(41)	0	34

Table 2 Continued

Regulatory year	Reported							Estimated kill				
	Hunter kill				Nonhunting kill[a]			Unreported illegal[b]	Total estimated kill			
	M (%)	F (%)	Unk.	Total	M	F	Unk.		M (%)	F (%)	Unk.	Total
Fall 1995	(75)	(25)	0	8	0	2	0	2[g]	(58)	(42)	0	12
Spring 1996	(83)	(17)	0	12	0	0	0	2[h]	(86)	(14)	0	14
Total	(80)	(20)	0	20	0	2	0	4	(69)	(31)	0	26
Fall 1996	(54)	(46)	0	13	0	0	0	0	(54)	(46)	0	13
Spring 1997	(78)	(22)	0	18	0	0	0	1[I]	(78)	(22)	0	19
Total	(68)	(32)	0	31	0	0	0	1	(69)	(31)	0	32
Fall 1997	(63)	(37)	0	16	1	1	0	2[J]	(65)	(35)	0	20
Spring 1998	(84)	(16)	0	19	0	0	0	0	(84)	(16)	0	19
Total	(74)	(26)	0	35	1	1	0	2	(74)	(26)	0	39
Fall 1998	(23)	(77)	0	13	1	2	0	0	(25)	(75)	0	16
Spring 1999	(86)	(14)	0	22	2	0	0	0	(92)	(8)	0	24
Total	(63)	(37)	0	35	3	2	0	0	(65)	(35)	0	40
Fall 1999	(80)	(20)	0	20	2	2	0	0	(75)	(25)	0	24
Spring 2000	(35)	(65)	0	20	2	0	0	0	(41)	(59)	0	22
Total	(58)	(42)	0	40	4	2	0	0	(59)	(41)	0	46

[a] Includes DLP kills, research mortalities, and other known human/caused accidental mortalities.
[b] Estimated to be 10% of reported kill (McCarthy 1991).
[c] First season registration permits required for hunting brown bear.
[d] One female was illegally killed and left along Fish Creek in Hyder, AK.
[e] Includes 1 male illegally killed at a black bear bait station in Unit 1D, and 1 female killed in Unit 1C by a hunter who failed to obtain a registration permit.
[f] One male, one female killed by hunters who failed to obtain registration permits.
[g] One male, 1 female taken illegally.
[h] Two males taken by hunters who failed to obtain registration permits.
[i] One male taken by a hunter who failed to obtain registration permit.
[j] One male and 1 female taken by hunters who failed to obtain registration permits.

Table 3 Unit 1 age and skull size of harvested brown bears, 1985–1999

	Mean skull size[a]				Mean age[b]			
Season	Male	Nr.	Female	Nr.	Male	Nr.	Female	Nr.
1985-1986	22.3	12	20.5	8	9.1	11	6.5	8
1986-1987	23.2	7	20.7	7	9.4	7	10.2	7
1987-1988	21.4	18	20.6	11	5.5	17	7.7	7
1988-1989	22.7	12	19.4	4	8.4	11	5.2	3
1989-1990	21.2	14	20.6	5	6.7	13	7.4	5
1990-1991	21.5	22	18.7	5	7.9	20	5.2	5
1991-1992	21.6	13	20.4	8	7.4	14	7.9	6
1992-1993	21.9	24	20.0	13	7.4	24	7.4	14[c]
1993-1994	21.9	16	20.3	6	6.4	16	3.4	5
1994-1995	22.9	18	20.5	11[c]	7.9	13	7.3	12[c]
1995-1996	21.7	18[d]	21.4	4	6.6	12	16.0	3
1996-1997	22.7	22	19.9	10	8.5	22	6.6	10
1997-1998	22.8	27	20.8	10	7.3	24	7.8	14
1998-1999	22.8	24	19.7	13	7.9	24	5.4	10[e]
1999-2000	21.7	26	19.4	16				
$\bar{x}$	22.2	18	20.2	9	7.6	16	7.4	7.8

[a] Skull size equals length plus zygomatic width.
[b] Determined through analyses of extracted premolar teeth.
[c] Includes 1 female taken illegally by a hunter who failed to obtain a registration permit.
[d] Includes 2 males taken illegally in Unit 1C by hunters who failed to obtain registration permits.
[e] Includes 2 female and 1 male DLP.

Table 4 Unit 1 brown bear registration permit data, 1989–1999

Season/ hunt nr.	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Bear harvest			
						Males (%)	Females (%)	Unknown	Total
(Fall)									
278F	1989[a]	44	(0)	(95)	(5)	(50)	(50)	0	2
278F	1990	67	(0)	(73)	(27)	(72)	(28)	0	18
272F	1991	182	(47)	(48)	(5)	(50)	(50)	0	12
272F	1992	149	(46)	(37)	(17)	(56)	(44)	0	25
272F	1993	146	(53)	(39)	(8)	(75)	(25)	0	12
272F	1994	135	(58)	(33)	(9)	(42)	(58)	0	12
272F	1995[b]	164	(55)	(39)	(6)	(67)	(33)	0	9
272F	1996[b]	147	(54)	(36)	(9)	(54)	(46)	0	13
272F	1997	175	(52)	(39)	(9)	(63)	(37)	0	16
272F	1998[d]	148	(53)	(38)	(9)	(23)	(77)	0	13
272F	1999	176	(56)	(33)	(11)	(35)	(65)	0	20
(Spring)									
278S	1990	60	(0)	(88)	(12)	(71)	(29)	0	7
278S	1991	59	(0)	(86)	(14)	(100)	(0)	0	9
272S	1992	142	(49)	(41)	(10)	(79)	(21)	0	14
272S	1993	131	(43)	(48)	(9)	(91)	(9)	0	11
272S	1994	133	(50)	(42)	(8)	(75)	(25)	0	12
272S	1995[c]	156	(43)	(46)	(11)	(76)	(24)	0	17
272S	1996	139	(44)	(47)	(9)	(83)	(17)	0	12
272S	1997	144	(40)	(47)	(13)	(78)	(22)	0	18
272S	1998	152	(46)	(41)	(13)	(84)	(16)	0	19
272S	1999	155	(50)	(36)	(14)	(86)	(14)	0	22
272S	2000[d]	167	(44)	(44)	(12)	(80)	(20)	0	20
Total	1989-1990	104	(0)	(91)	(9)	(67)	(33)	0	9
	1990-1991	126	(0)	(79)	(21)	(81)	(19)	0	27
	1991-1992	324	(48)	(45)	(7)	(65)	(35)	0	26
	1992-1993	280	(44)	(43)	(13)	(64)	(36)	0	36

Season/ hunt nr.	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Bear harvest			
						Males (%)	Females (%)	Unknown	Total
	1993-1994	279	(51)	(41)	(8)	(75)	(25)	0	24
	1994-1995	291	(49)	(41)	(10)	(62)	(38)	0	29
	1995-1996	303	(50)	(43)	(7)	(80)	(20)	0	20
	1996-1997	291	(47)	(42)	(11)	(68)	(32)	0	31
	1997-1998	327	(49)	(40)	(11)	(74)	(26)	0	35
	1998-1999	303	(51)	(37)	(12)	(63)	(37)	0	35
	1999-2000	343	(50)	(38)	(12)	(58)	(42)	0	40
	$\bar{x}$	270	(40)	(49)	(11)	(69)	(31)	0	28

[a] First season permits required for Unit 1 brown bear hunt.
[b] Three hunters did not return permits.
[c] Two hunters did not return permits.
[d] One hunter did not return permit.

Table 5 Unit 1 successful brown bear hunters by residency, 1985–1999[a]

Regulatory year	Local resident[b] (%)	Nonlocal resident (%)	Nonresident (%)	Unknown	Total successful hunters
1985-1986	(61)	(26)	(13)	0	23
1986-1987	(60)	(27)	(13)	0	15
1987-1988	(58)	(27)	(12)	3	33
1988-1989	(56)	(19)	(25)	0	16
1989-1990[c]	(45)	(25)	(30)	0	20
1990-1991	(63)	(7)	(26)	1	27
1991-1992	(65)	(4)	(23)	2	26
1992-1993	(47)	(8)	(45)	1	37
1993-1994	(54)	(21)	(25)	0	24
1994-1995	(38)	(21)	(41)	0	29
1995-1996	(30)	(15)	(55)	0	20
1996-1997	(29)	(16)	(55)	0	31
1997-1998	(26)	(23)	(31)	0	35
1998-1999	(37)	(23)	(40)	0	35
1999-2000	(25)	(12)	(63)	0	40
$\bar{x}$	(46)	(18)	(33)	0	27

[a] Does not include illegal kills.
[b] Local residents are those hunters who reside in Unit 1.
[c] Before 1989-90 all harvest data were obtained solely from sealing records.

Table 6 Unit 1 brown bear seasonal harvest chronology, 1985–1999[a]

Regulatory year	Fall		Spring	
	Harvest	Percent of total	Harvest	Percent of total
1985-1986	12	(52)	11	(48)
1986-1987	5	(33)	10	(67)
1987-1988	16	(48)	17	(52)
1988-1989	11	(69)	5	(31)
1989-1990	10	(50)	10	(50)
1990-1991	18	(67)	9	(33)
1991-1992	12	(46)	14	(54)
1992-1993	25	(68)	12	(32)
1993-1994	12	(50)	12	(50)
1994-1995	12	(41)	17	(59)
1995-1996	8	(40)	12	(60)
1996-1997	13	(42)	18	(58)
1997-1998	16	(46)	19	(54)
1998-1999	13	(37)	22	(63)
1999-2000	20	(50)	20	(50)
$\bar{x}$	14	(49)	14	(51)

[a] Does not include illegal kills.

Table 7 Unit 1 brown bear monthly harvest chronology, 1985–1999[a]

Regulatory year	Harvest periods							Total
	September	October	November	March	April	May	June	
1985-1986	6	4	1	0	0	12	0	23
1986-1987	6	2	2	0	1	4	0	15
1987-1988	9	4	4	0	0	15	1	33
1988-1989	2	2	1	0	0	10	1	16
1989-1990	2	7	1	0	0	10	0	20
1990-1991	9	8	1	0	1	8	0	27
1991-1992	8	2	2	1	0	13	0	26
1992-1993	14	10	1	0	3	9	0	37
1993-1994	6	5	1	0	1	11	0	24
1994-1995	8	3	1	0	1	16	0	29
1995-1996	3	4	1	0	0	12	0	20
1996-1997	10	3	0	0	3	15	0	31
1997-1998	7	9	0	0	1	18	0	35
1998-1999	7	6	0	0	0	22	0	35
1999-2000	15	5	0	0	0	20	0	40
$\bar{x}$	7	5	1	0	1	13	0	27

[a] Does not include illegal kills.

Table 8 Unit 1 successful brown bear hunter transport methods, 1985–1999[a]

Regulatory year	Percent of harvest						Nr.
	Airplane	Boat	Walk	ORV	Highway vehicle	Other-unknown	
1985-1986	(4)	(61)	(4)	(9)	(13)	(9)	23
1986-1987	(7)	(53)	(0)	(13)	(27)	(0)	15
1987-1988	(12)	(52)	(9)	(12)	(6)	(9)	33
1988-1989	(6)	(63)	(6)	(6)	(13)	(6)	16
1989-1990	(10)	(70)	(5)	(5)	(5)	(5)	20
1990-1991	(15)	(52)	(7)	(15)	(4)	(7)	27
1991-1992	(8)	(62)	(0)	(8)	(3)	(19)	26
1992-1993	(17)	(50)	(0)	(3)	(30)	(0)	37
1993-1994	(0)	(71)	(4)	(0)	(25)	(0)	24
1994-1995	(3)	(76)	(7)	(0)	(14)	(0)	29
1995-1996	(0)	(70)	(5)	(0)	(25)	(0)	20
1996-1997	(3)	(71)	(3)	(3)	(20)	(0)	31
1997-1998	(3)	(66)	(0)	(0)	(31)	(0)	35
1998-1999	(0)	(83)	(3)	(0)	(14)	(0)	35
1999-2000	(8)	(72)	(0)	(0)	(20)	(0)	40
$\bar{x}$	(6)	(65)	(4)	(5)	(17)	(4)	27

[a] Does not include illegal or DLP kills.

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BROWN BEAR MANAGEMENT REPORT

From: 1 July 1998
To: 30 June 2000

LOCATION

GAME MANAGEMENT UNIT: Unit 4 (5800 mi^2)

GEOGRAPHIC DESCRIPTION: Admiralty, Baranof, Chichagof, and adjacent islands

BACKGROUND

Brown bears inhabit the major islands in Game Management Unit 4 (Admiralty, Baranof, Chichagof, Kruzof, Yakobi, and Catherine islands). The population has been isolated from mainland brown/grizzly bear populations for over 40,000 years and is genetically distinct from other bears (Heaton et al. 1996, Talbot and Shields 1996).

Management of Unit 4 brown bears has had a colorful and controversial past. In the early part of the century there were advocates pressing widely differing views – some were for the elimination of brown bears while others wanted better preservation of brown bears. Eventually, support for greater protection of the valuable bear resource (ADF&G 1998) overcame market hunting for hides and calls for the elimination of bears, and the department developed more restrictive harvest regulations.

The Tongass National Forest encompasses most Unit 4 bear habitat and is managed under a multiple-use concept by the U.S. Forest Service (FS). On both federal and private lands there has been extensive long-term habitat alteration by commercial logging. Wilderness designations on Admiralty, south Baranof, and west Chichagof islands, however, contain large areas that should continue to provide bears with pristine environments. Elsewhere in the unit, habitat alteration by logging will continue to affect brown bear density and distribution.

Unit 4 is the most important brown bear hunting area in Southeast Alaska. Unit 4 has nearly 70% of the estimated brown bears (Miller 1993*a*) and has produced 67% of the harvest in recent years (Miller 1993*b*). Federal assumption of subsistence management under the terms of the Alaska National Interest Lands Conservation Act (ANILCA) included authority for brown bears on federal lands. This dual authority with the State of Alaska has confused the public and may deny state wildlife managers the use of options available in other areas.

An increasing number of brown bear guides and hunters, as well as increased tourism in Unit 4, have led to user conflicts. In July 1998, the Alaska Department of Fish and Game (ADF&G) published "Unit 4 Brown Bears – Past, Present, and Future: A Status Report and Issues Paper."

The Unit 4 Brown Bear Management Team (Team) was created by the Board of Game in January 1999, with 15 members nominated by organizations representing most consumptive and nonconsumptive user groups. The purpose was to review bear management issues and any human activities that affected brown bears. The Team agreed to several elements of a comprehensive management strategy, and a report was published (ADF&G 2000).

Three areas in Unit 4 are closed to bear hunting to enhance viewing opportunities: Seymour Canal Closed Area on eastern Admiralty Island, which encompasses the Stan Price State Wildlife Sanctuary; Salt Lake Closed Area at Mitchell Bay on southwest Admiralty Island; and the Port Althorp Closed Area on northern Chichagof Island.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

- Maintain an average age of harvested males of at least 6.5 years.
- Maintain a male to female harvest ratio of at least 3:2.
- Reduce the number of bears killed in defense of life or property (DLP).
- Maintain the annual human-caused mortality of all brown bears at no more than 4% of each island's population estimate (Admiralty, Baranof, Northeast Chichagof, and the remainder of Chichagof), averaged over a 3-year period.
- Maintain the annual human-caused mortality of females at no more than 1.5% of each island's population estimate, averaged over a 3-year period.

METHODS

Unit 4 brown bear registration hunting permits were issued to the public at ADF&G offices. Successful bear hunters were required to present skulls and hides to a representative of the Division of Wildlife Conservation (DWC) or the Alaska Department of Public Safety, Division of Fish & Wildlife Protection (FWP) for sealing. Bear sealers measured skulls, extracted premolars, confirmed sex, and recorded data on the date and location of kill, hunter residency, hunt length, guide services used, and primary transportation. A commercial laboratory determined ages through premolar cementum annuli analyses. All persons obtaining permits were required to report on hunting activities immediately after taking a bear or following the close of the season.

Data recorded on sealing forms and registration permit reports were entered into a computer database. Delinquent permittees were sent reminder letters and certified letters to improve reporting compliance. FWP cited permittees who failed to report.

Project personnel attempted to reduce defense of life or property (DLP) incidents through education and cooperation with community authorities and other agencies.

In an effort to update population estimates, 40 additional bears were captured through helicopter darting or foot-snaring techniques and outfitted with telemetry devices. These bears will be considered the marked sample in a capture-mark-resight (CMR) population estimation effort planned for completion in July 2001.

Personnel from DWC and FS contacted visitors at Pack Creek in the Stan Price State Wildlife Sanctuary. The program was staffed from late June through August to interpret bear behavior and management, promote public safety, prevent DLP loss of habituated bears, and explain regulations associated with the cooperative management area. In the summers of 1998 and 1999, a total of 1392 and 1351 visits were recorded at Pack Creek associated with brown bear viewing. Summer 2000 saw 1400 Pack Creek visitors.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Unit 4 brown bear populations are stable or slightly increasing. Analysis of historical harvest data indicates that bear numbers probably declined during the mid-1970s but have since recovered (Faro 1997, Whitman 1999). Harvest levels from portions of the unit continue to warrant close scrutiny. Expansion of the logging road system, particularly on northeast Chichagof Island, has increased the vulnerability of bears to hunters. High harvest occurs because logging roads allow hunters greater efficiency in accessing salmon streams, bays, and estuaries (Young 1989, 1990; Titus and Beier 1992).

Population Size

Titus and Beier (1993) reported bear densities on Admiralty and Northeast Chichagof islands study areas. These studies provide the basis for population estimates for major areas of the unit. The current population estimate for the entire unit is 4155 bears; Chichagof and adjacent islands, 1550; Baranof and adjacent islands, 1045; and Admiralty Island, 1560. For management purposes, the lower 95% confidence limit is used as a conservative population level, and we have attempted to maintain harvests at 4% or less of that population.

Population Composition

Data are limited on the population composition of the population of brown bears throughout Unit 4. The number of adult male bears captured during DWC research programs has been small, and we believe capture bias has resulted in a sample not representative of the sexes and age classes of bears in the population. Age and sex data from hunter harvest are biased by hunter selectivity, the vulnerability of young bears, regulations protecting females with offspring, and misidentification of harvested bears by sealers.

In Unit 4 the 1998-1999 harvest by hunters was 71% males (n = 91) and 29% females (n = 37). The 1999-2000 harvest was 76% males (n = 126) and 24% females (n = 40). Table 1 displays sex information for the last 5 regulatory years.

Distribution and Movements

Researchers continued to monitor radiocollared bears on the Northeast Chichagof Controlled Use Area (NECCUA) and Admiralty Island to gather basic life history data. Sample sizes are small, but indications are that adult bears tend to make little change in home ranges once they have become established. Some subadults, particularly males, make extensive movements from their mothers' home ranges. The importance of subadult dispersal in maintaining viable brown bear populations is poorly understood.

MORTALITY

Harvest

Season and Bag Limit	Resident and Nonresident Hunters
Unit 4: Chichagof Island south and west of a line which follows the crest of the island from Rock Point (58°N. lat, 136°21'W. long.) to Rodgers Point (57°35'N. lat., 135°33'W. long.), including Yakobi and other adjacent islands; Baranof Island south and west of a line which follows the crest of the island from Nismeni Point (57°34'N. lat., 135°25'W. long.), to the entrance of Gut Bay (56°44'N. lat., 134°38'W. long.), including the drainages into Gut Bay and including Kruzof and other adjacent islands.	Sep 15–Dec 31 Mar 15–May 31
One bear every 4 regulatory years by registration permit only	
Unit 4: that portion in the Northeast Chichagof Controlled Use Area north of the Spasski Trail and the Gartina Highway	Sep 15–Sep 30 Mar 15–May 20
One bear every 4 regulatory years by registration permit only	
Unit 4: remainder of the Northeast Chichagof Controlled Use Area	Mar 15–May 20
One bear every 4 regulatory years by registration permit only	
Remainder of Unit 4:	Sep 15–Dec 31 Mar 15–May 20
One bear every 4 regulatory years by registration permit only	

Board of Game Actions and Emergency Orders. In their November 2000 meetings, the Alaska Board of Game reviewed and endorsed the findings of the Unit 4 Brown Bear Management Team (ADF&G 2000), supporting the FS in their attempts to decrease hunter crowding issues and limit the numbers of guides (thus, nonresident harvest). The Board adopted no regulatory changes.

Forest Service Moratorium for Nonresident Hunters. The number of successful nonresident brown bear hunters in Southeast Alaska assisted by outfitter/guides has recently increased considerably, raising concerns about sustainable harvest levels. A FS moratorium issued in summer 2000 will limit the level of Unit 4 guide activity beginning spring 2001. Over the past 10 years the number of active Unit 4 hunting guides quadrupled. Because the state lacks authority to limit guides, the FS, at the request of ADF&G, restricted active guides to the average of their 1997 and 1998 client levels. At the time the Unit 4 Brown Bear Management Team was created in January 1999, the Team identified the likelihood of a "domino effect", redirecting hunting pressure should any Unit 4 restrictions be put in place. This became a reality, resulting in increased effort and higher harvest elsewhere in Region I, and has prompted a more comprehensive view of brown bear management by all Region I wildlife managers.

Hunter Harvest.

Regulatory Year 1998/99: Hunters took 38 brown bears in fall 1998 and harvested 90 in spring 1999. The total for the year was 128 bears. An additional 7 bears are known to have died as the result of human-induced causes, bringing the year's total to 135 bears.

Regulatory Year 1999/00: Hunters took 48 bears in fall 1999 and 118 in spring 2000. Hunting accounted for 166 bears and 6 others were reported killed; the combined mortality for the year was 172 bears. Data concerning brown bear harvests for the past 5 years are presented in Tables 1 and 2.

Recent trends in skull sizes and mean ages of harvested bears closely match those found in historical data, indicating stable trends. Ages and skull sizes for Baranof and Chichagof islands are comparable to Admiralty data, also indicating a stable trend.

Hunter Residency and Success. Management of all permit hunt areas is annually administered under a single registration permit. Hunting pressure in each hunt area is determined from permit hunt reports at the end of the season. Table 4 summarizes the data for each area with discrete seasons.

Local residents, defined as residents of Unit 4, take a small percentage of the total annual harvest (Table 3). Most bears were taken by nonresidents or Alaska hunters from other areas of the state. In 1998/99 nonlocal Alaska hunters and nonresidents harvested 92% of the bears. In 1999/00 nonresidents and nonlocal Alaskans took 90% of the bears.

Spring and fall hunting effort is presented in Table 4. In fall 1998, 80 Alaska residents hunted a total of 365 days, while 57 nonresidents spent 349 days afield. In fall 1999, 81 residents hunted 424 days and 54 nonresidents hunted 339 days. Spring seasons produce a larger harvest (Table 1) and have the greater hunting pressure (Table 4). In spring 1999, 101 residents hunted 351 days

and 115 nonresidents hunted 802 days. In spring 2000, 156 residents hunted 570 days and 113 nonresidents hunted 680 days. Fall seasons produced 1 bear for every 17.2 hunt days, and spring seasons produced 1 bear for every 11.6 days.

Harvest Chronology. Most fall harvest occurs during the first 2 weeks of the season (Table 5). The greatest hunting pressure occurs early because weather is generally more favorable and many bears have not yet left salmon streams. Adverse weather and dispersal from streams make it increasingly difficult to locate bears late in the fall. A high percentage of females are characteristically in the fall harvest (Table 1).

The percentage of male bears killed during spring seasons is higher than the percentage of males killed in the fall, but the actual number of females killed in the spring is frequently greater than in the fall (Table 1). A greater number of bears are available to hunters late in the spring season because nearly all bears have left their dens and are seeking food. Most spring bears are killed in May (Table 5). In late spring, bears can concentrate and feed on grass/sedge flats near salt water. In such years, harvests are higher than in years with early "green-up" that provide bears with more dispersed feeding opportunities.

Transport Methods. Unit 4 bear hunters use boats as the most common form of transportation (Table 6). In 1998/99, 91% of successful hunters used boats. In 1999/00, successful hunters used boats 92% of the time. Aircraft are the second most important means of hunter transport but were used by only 6% and 4% of successful hunters in the 1998/99 and 1999/00 seasons, respectively.

Other Mortality

To reduce DLP mortality, we worked with local communities and agencies associated with public safety. Most nonhunting mortality results from bears entering areas developed for human use. Such situations are most effectively addressed by eliminating improper garbage disposal or food storage. Most DLP incidents involve bears that have become habituated to humans.

In 1998/99, 7 nonhunting mortalities were reported (Table 1); 6 occurred in 1999/00. Of these 13 bears, 5 were illegal kills (generally related to hunters not obtaining registration permits), and 8 were taken under DLP provisions.

Bear Viewing. Public interest in viewing bears has steadily increased at the Stan Price State Wildlife Sanctuary. During summer 1998, 1392 people visited the sanctuary, in 1999 the number of visitors was 1351, and in 2000, 1400 visitors were logged. Many tour operators are now taking visitors to other locales in Unit 4, but quantifying this use has been impossible.

HABITAT

Assessment and Enhancement

We did not conduct any habitat assessment studies or enhancement projects during this report period.

CONCLUSIONS AND RECOMMENDATIONS

Management objectives for harvested male brown bear ages were met in both years. Mean ages of harvested bears from all subpopulations exceed the 6.5-year minimum objective. The male to female harvest ratio was 3:1.22 in 1998/99 and 3:0.95 in 1999/00, clearly surpassing the management objective of 3:2.

The objective of reducing bear loss due to DLP mortality is difficult to measure, but declines in non-hunting mortality (Table 1) suggest efforts may be working. DWC continued to work with FS and the Alaska Department of Environmental Conservation to address landfill problems in logging camps and communities to minimize DLP losses.

For harvest purposes, Admiralty Island, Baranof/Kruzof Islands, Northeast Chichagof Island, and the remainder of Chichagof/Yakobi Islands are managed as 4 subpopulations. These areas are large enough to encompass viable bear populations, and water barriers largely restrict dispersal of subadults between areas. Hunting pressure on brown bears requires the use of all available information concerning the population status for management actions. None of these subpopulations are currently experiencing excessive human-induced mortality; mortality levels (Table 2) are close to, yet still below the conservative guideline of 4% of the population, and well below the threshold for total human-caused female mortality. Attempts to "micro-manage" smaller areas could redirect hunting pressure and create a "domino effect" of management problems. Future seasons may require some regulatory change in specific areas that receive high hunter effort to maintain biological or aesthetic standards. More information on Unit 4 brown bear movements is necessary before attempting management of smaller subpopulations. Harvest increases may make it necessary to recommend regulatory changes to dampen the trend in increasing bear kills. Because of the FS moratorium, harvests by nonresidents are expected to stabilize.

Extension of the NECCUA in 1994 to north of Port Frederick due to extensive logging road construction appears to have prevented excessive harvest in that area. Chichagof Island has experienced the greatest long-term habitat alteration from logging of all Unit 4 areas, thus bear habitat on that island is the least secure in the unit. Continuing research on Chichagof’s bear population is necessary to provide managers with population information. A survey scheduled for summer 2001 should provide that information.

Funding for the Pack Creek bear viewing program with traditional hunting-generated funds has become increasingly controversial. We need to develop a secure source of funding to maintain this popular nonhunting activity. Currently about 50% of the funds needed to operate the Admiralty Island site come from visitor fees, and the balance from the State General Fund.

ACKNOWLEDGMENTS

DWC staff contributed significantly to the Unit 4 brown bear management program. The following deserve specific mention: LaVern Beier, Bruce Dinneford, Tom Paul, Anne Post, Matt Robus, Linda Schmidt, and Kim Titus. Additional support came from the Department of Public Safety, Division of Fish and Wildlife Protection, especially from Terry Lovett, Clyde Campbell, and Greg Garcia.

LITERATURE CITED

ADF&G. 1998. Brown Bears of Unit 4 – Past, Present and Future: A Status Report and Issues Paper. July 1998. ADF&G. Juneau. 67 pages.

ADF&G. 2000. Southeast Alaska. Unit 4 Brown Bear Management Strategy. ADF&G. Juneau. 47 pages.

HEATON, H. T., S. L. TALBOT, and G. F. SHIELDS. 1996. An ice age refugium for large mammals in the Alexander Archipelago, Southeast Alaska. Quaternary Research 46, 186–192.

FARO, J. B. 1997. Unit 4 brown bear survey-inventory report. Pages 2–3 *in* M.V. Hicks. Ed. Annual report of survey-inventory activities. Alaska Department of Fish and Game, Federal Aid in Wildlife Restoration. Juneau Alaska USA

MILLER, S. D. 1993*a*. Development and improvement of bear management techniques and procedures in Southcentral Alaska. Alaska Department of Fish and Game, Federal Aid in Wildlife Restoration Research Progress Report, Project W–24–1, Study 4.24. 40pp.

———. 1993*b*. Brown bears in Alaska: A statewide management overview. Alaska Department of Fish and Game, Federal Aid in Wildlife Technical Bulletin No. 11. 40pp.

TALBOT, S. L. and G. F. SHIELDS. 1996. A phylogeny of the bears (Ursidae) inferred from complete sequences of three mitochondrial genes. Molecular Phylogenetics and Evolution 5:567–575.

TITUS, K. and L. R. BEIER. 1992. Population and habitat ecology of brown bears on Admiralty and Chichagof islands. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration. Research Progress Report. Project W–23–4, 29pp.

———. 1993. Population and habitat ecology of brown bears on Admiralty and Chichagof islands. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration. Research Progress Report. Project W–24–1, 40pp.

WHITMAN, J. S. 1999. Unit 4 brown bear survey-inventory report. In M.V. Hicks, ed. Annual report of survey-inventory activities. Part I. Vol. V. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration. Juneau Alaska USA

YOUNG, E. L. 1989. Unit 4 brown bear survey-inventory report. In S. O. Morgan. ed. Annual report of survey-inventory activities. Part I. Vol. V. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration. Juneau Alaska USA

———. 1990. Unit 4 brown bear survey-inventory report. In S. O. Morgan. ed. Annual report of survey-inventory activities. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration. Juneau Alaska USA

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Table 1 Unit 4 brown bear harvest, 1995–1999

Regulatory year	Hunter kill					Nonhunting kill[a]				Total reported
	M	F	(%F)	Unk.	Total	M	F	Unk	Total	
1995										
Fall 95	23	11	(32)	0						
Spring 96	66	24	(27)	0						
Total	89	35	(28)	0	124	5	7	3	15	139
1996										
Fall 96	23	11	(32)	0						
Spring 97	81	14	(15)	0						
Total	104	25	(19)	0	129	11	5	3	19	148
1997										
Fall 97	14	12	(46)	0						
Spring 98	93	15	(14)	0						
Total	107	27	(20)	0	134	4	3	1	8	142
1998										
Fall 98	17	21	(53)	0	38	3	2	1	6	44
Spring 99	74	16	(18)	0	90	1	0	0	1	91
Total	91	37	(29)	0	128	4	2	1	7	135
1999										
Fall 99	27	21	(44)	0	48	3	1	0	4	52
Spring 00	99	19	(16)	0	118	2	0	0	2	120
Total	126	40	(24)	0	166	5	1	0	6	172

[a] Includes defense of life or property kills, research mortalities, and other known human-caused accidental mortality. Does not include bears that were found dead.

Table 2 Brown bear hunting pressure[a] and mortality[b] by major geographic areas in Unit 4, regulatory years 1995–1999

Hunt area	Year	Nr hunters	M	(%)[c]	F	(%)[c]	Unknown	(%)[d]	Total harvest	Percent Estimated population[e]
Northeast										
Chichagof Island										
	1995/96		5		3		0		8	2.3
	1996/97		8		1		0		9	2.5
	1997/98		7		0		0		7	2.0
	1998/99		5		3		0		8	2.3
	1999/00		9		2		0		11	3.1
Remainder of Chichagof Island										
	1995/96		28		12		0		40	3.3
	1996/97		35		9		0		44	3.7
	1997/98		37		7		0		44	3.7
	1998/99		33		6		0		39	3.3
	1999/00		42		10		0		52	4.3
Baranof and Kruzof islands										
	1995/96	74	20	(67)	10	(33)	0		30	2.9
	1996/97	63	21	(91)	2	(9)	0		23	2.2
	1997/98	86	18	(67)	9	(33)	0		27	2.6
	1998/99	120	18	(51)	17	(49)	0		35	3.3
	1999/00	92	31	(67)	15	(33)	0		46	4.4
Baranof and Chichagof islands[f]										
	1995/96	9								
	1996/97	7								
	1997/98	12								
	1998/99	0								
	1999/00	2								
Admiralty Island										
	1995/96	126	36	(78)	10	(22)	0		46	2.9
	1996/97	133	40	(75)	13	(25)	0		53	3.4
	1997/98	147	45	(80)	11	(20)	0		56	3.6
	1998/99	138	35	(76)	11	(24)	0		46	2.9
	1999/00	150	44	(77)	13	(23)	0		57	3.7
Unit 4 Totals										
	1995/96		89	(72)	35	(28)	0		124	3.0
	1996/97		104	(81)	25	(19)	0		129	3.1
	1997/98		107	(80)	27	(20)	0		134	3.2

Percent

Hunt area	Year	Nr hunters	M	(%)[c]	F	(%)[c]	Unknown	(%)[d]	Total harvest	Estimated population[e]
	1998/99		91	(71)	37	(29)	0		128	3.1
	1999/00		126	(76)	40	(24)	0		166	4.0

[a] Registration permit data.
[b] Bear sealing data.
[c] Percentage based on known sex bears.
[d] Percentage based on total bears.
[e] Estimated populations: NE Chichagof Island, 354 bears; remainder of Chichagof Island, 1196; Baranof and Kruzof islands, 1045 bears; Admiralty Island, 1560 bears; all Unit 4, 4155 bears.
[f] Unsuccessful hunters who indicated both Baranof and Chichagof islands as hunt locations.

Table 3 Unit 4 brown bear successful hunter residency, 1995–1999

Regulatory year	Local resident[a]	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total successful hunters
1995/96	18	(14)	23	(19)	83	(67)	124
1996/97	16	(12)	17	(13)	96	(75)	129
1997/98	13	(10)	30	(22)	91	(68)	134
1998/99	10	(8)	19	(15)	99	(77)	128
1999/00	16	(10)	33	(20)	117	(70)	166

[a] Resident of Unit 4.

Table 4 Unit 4 hunting effort by residency, by island, 1995–1999

Island	Season	Nr. resident hunters	Nr. nonresident hunters	Total hunters	Days hunted by residents	Days hunted by nonresidents	Nr. days hunted	Nr. bears killed	Days effort per bear
Admiralty Island									
	Fall 1995	30	7	37	112	35	147	10	15
	Spring 1996	53	36	89	204	200	404	36	11
	Fall 1996	23	19	42	106	79	185	13	14
	Spring 1997	56	35	91	195	189	384	40	10
	Fall 1997	26	14	40	140	80	220	10	22
	Spring 1998	64	43	107	283	251	534	46	12
	Fall 1998	24	15	39	146	89	235	9	26
	Spring 1999	50	49	99	165	370	535	37	14
	Fall 1999	24	18	42	118	129	247	12	21
	Spring 2000	58	50	108	249	289	538	45	12
Baranof Island									
	Fall 1995	29	9	38	85	36	121	14	9
	Spring 1996	15	22	37	42	143	185	16	12
	Fall 1996	16	7	23	63	46	109	6	18
	Spring 1997	23	17	40	81	73	154	17	9
	Fall 1997	20	10	30	111	54	165	5	33
	Spring 1998	31	24	55	104	146	250	22	11
	Fall 1998	38	26	64	158	172	330	20	17
	Spring 1999	14	23	37	46	104	150	15	10
	Fall 1999	33	22	55	163	123	286	22	13
	Spring 2000	35	25	60	92	154	246	24	10
Chichagof Island									
	Fall 1995	11	9	20	31	54	85	10	9
	Spring 1996	29	39	68	129	197	326	38	9
	Fall 1996	18	11	29	80	45	125	15	8
	Spring 1997	24	35	59	93	218	311	38	8
	Fall 1997	16	10	26	68	59	127	11	12
	Spring 1998	32	41	73	141	244	385	40	10
	Fall 1998	18	16	34	61	88	149	9	17
	Spring 1999	37	43	80	140	328	468	38	12
	Fall 1999	24	14	38	143	87	230	14	16
	Spring 2000	61	38	99	227	237	464	49	9

TABLE 4 CONTINUED

Island	Season	Nr. resident hunters	Nr. nonresident hunters	Total hunters	Days hunted by residents	Days hunted by nonresidents	Nr. days hunted	Nr. bears killed	Days effort per bear
Baranof & Chichagof islands, unspecified									
	Fall 1996	0	1	1	0	2	2		
	Spring 1997	4	2	6	15	17	32		
	Fall 1997	1	2	3	3	16	19		
	Spring 1998	3	6	9	8	66	74		
	Fall 1998	0	0	0	0	0	0		
	Spring 1999	0	0	0	0	0	0		
	Fall 1999	0	0	0	0	0	0		
	Spring 2000	2	0	2	2	0	2		
Unit 4 Totals									
	Fall 1995	70	26	96	228	129	357	34	11
	Spring 1996	100	101	201	393	556	949	90	11
	Fall 1996	57	38	95	249	172	421	34	12
	Spring 1997	107	89	196	384	497	881	95	9
	Fall 1997	63	36	99	322	209	531	26	20
	Spring 1998	130	114	244	536	707	1243	108	12
	Fall 1998	80	57	137	365	349	714	38	19
	Spring 1999	101	115	216	351	802	1153	90	13
	Fall 1999	81	54	135	424	339	763	48	16
	SPRING 2000	156	113	269	570	680	1250	118	11

Table 5 Unit 4 brown bear harvest chronology, 1995–1999[a]

Regulatory year	Fall harvest periods 9/11–9/20	9/21–9/30	10/1–10/10	10/11–10/20	10/21–10/31	11/1–11/10	11/11–11/20	11/21–11/31	12/1–12/10	12/11–12/20	12/21–12/31
1995/96	17	12	2	1	0	1	1	0	0	0	0
1996/97	15	9	3	1	3	1	2	0	0	0	0
1997/98	13	5	4	0	1	2	1	0	0	0	0
1998/99	16	11	8	3	0	0	0	0	0	0	0
1999/00	16	19	10	1	1	0	1	0	0	0	0

	Spring harvest periods 4/1–4/10	4/11–4/20	4/21–4/30	5/1–5/10	5/11–5/20	5/21–5/31	Total
1995/96	1	1	10	33	35	10	124
1996/97	0	0	14	32	39	10	129
1997/98	0	1	9	45	43	10	134
1998/99	0	0	4	21	51	14	128
1999/00	0	0	8	45	53	12	166

[a] Includes all hunts.

Table 6 Unit 4 brown bear harvest by transport method, 1995–1999[a]

Regulatory year	Airplane	Boat	Walked	Off-road vehicle	Highway vehicle	Unknown
1995/96	8	112	2	0	2	0
1996/97	7	120	1	0	1	0
1997/98	13	118	1	0	2	0
1998/99	8	117	2	0	0	1
1999/00	6	153	3	3	1	0

[a] Sealing certificate data and registration permit data often differ. Sealing certificate data were used.

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BROWN BEAR MANAGEMENT REPORT

From: 1 July 1998
To: 30 June 2000

LOCATION

GAME MANAGEMENT UNIT: 5 (5800 mi^2)
GEOGRAPHIC DESCRIPTION: Cape Fairweather to Icy Bay, Eastern Gulf Coast.

BACKGROUND

Brown bears probably first occurred on the Yakutat and Malaspina forelands following glacial retreat 300 to 500 years ago. Like many other wildlife species, brown bears gained access to the eastern gulf coast by moving from the Alaska/Canada Interior via the Alsek/Tatshenshini corridor.

Since 1961 when brown bears were first sealed in Alaska, 935 sport-killed bears have been sealed from Unit 5 (782 from 5A and 153 from 5B). Sixty-six percent of these bears were males, with 65% taken by nonresident hunters. An additional 64 bears have been taken in situations other than legal hunts during the same time period.

A 1988 Superior Court decision that deregulated the big game guide industry started an increase in guide activity in Southeast Alaska. From 1980 through 1988 the average number of guided nonresident brown bear hunters per year in Unit 5 was 22. Since then, the number has climbed to an average of 26 per year.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

- Maintain a male-to-female harvest ratio of at least 3:2 and an average age of harvested males of at least 6.5 years.

METHODS

Alaska Department and Fish and Game and Division of Fish and Wildlife Protection staff gathered most data while sealing brown bears. State game regulations require brown bear hides and skulls to be sealed within 30 days of harvest. Skulls are measured and a pre-molar tooth is extracted for age determination. Additional information is collected from hunters, such as harvest date and location, transportation method, guide information, and number of days of effort. Hunters also provide anecdotal information from their observations in the field.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population information is not available for Unit 5 brown bears. Data gathered from sealing certificates, incidental observations and hunter interviews indicate no notable changes in the population. However, the 2 highest kills on record occurred in 1991 and 1992 when 41 and 42 brown bears were harvested, respectively. Since that time the harvest has ranged from 27 to 38. Although the average male age and skull size decreased slightly during the years of higher harvest, those measures have returned to or have exceeded long-term averages.

MORTALITY

Harvest

Season and Bag Limit	Resident and Nonresident Hunters
1 bear every 4 regulatory years	Sep 1–May 31

Board of Game Actions and Emergency Orders. During the fall 2000 Board of Game deliberations the Board adopted an ADF&G proposal to require all Unit 5 brown bear hunters to acquire a registration permit prior to hunting. This regulation will assist ADF&G biologists with information on brown bear hunting effort as well as more precise harvest information.

Hunter Harvest. Unit 5 brown bear harvests have stabilized after decreasing from all-time highs in the early 1990s. Prior to the early 1990s, brown bear harvests had constantly increased since sealing began. The average kill from 1971–80 was 21 bears, with a range of 13–28. The 1981–90 mean harvest was 30, ranging from 23–33 bears. Since 1990, the annual average harvest has been 34 bears, with a mean annual harvest during the current report period of 33 bears. The mean male age increased between the 1970s (5.8 years) and the 1980s (7.0 years), but dropped to a mean of 6.1 years for 1990 through 1997. During 1998, 28 males and 7 females were reported taken (Table 1). Males composed 80% of the harvest, which is the highest percentage since 1991, and substantially higher than the mean of 72% in the 1989–1997 harvests. Average male skull size of 23.5 inches was slightly higher than the previous 9-year average of 22.8 inches. The average male age (4.2 years) was more than 2 years below our management objective of 6.5 years.

In 1999, hunters killed 23 male and 8 female brown bears (Table 1). Males composed 74% of the harvest. Mean male skull size was 23.5 inches, but age information is not yet available.

Hunter Residency and Success. From 1991 through 1997 nonresidents accounted for an average of 78% of the Unit 5 brown bear harvest (Table 3). The percentage increased slightly to 81% in 1998-2000.

Harvest Chronology. From 1991–97 the average proportion of brown bears taken in the spring was 45% (Table 2). In 1998 and 1999, this value continued with 40% and 42% of the bears being killed in the spring, respectively.

Transport Methods. Transportation types used in successful 1998 brown bear hunts included aircraft (72%), boats (11%), highway vehicles (11%), ORV's (3%), and walking (3%). In 1999 aircraft were used by only 35% of the successful brown bear hunters, and the use of boats increased to 35%, while ORV's and highway vehicles accounted for 20% and 10%, respectively (Table 4). The decrease in airplane access and increase in ORV use in 1999 may be more a product of hunter interpretation of the question on the sealing certificate than a real change in transportation type, based on the fact that most hunting effort was based out of camps owned and operated by hunting guides, and their modes of operation have not changed.

Other Mortality

This category refers to bears killed in defense of life or property, illegal kills, road kills, and nuisance bears. The Yakutat landfill is the main area of concern for these types of mortalities. The landfill attracts dozens of brown bears throughout the year, and some of these are eventually killed. In 1998, a highway vehicle passing close to the dump killed 1 juvenile female bear. In fall 1999, 2 adult male bears that were aggressive toward people at the dump were dispatched, and 3 others (2 males and 1 female) were killed illegally. Two of these illegal bears were found dead and unclaimed, and a hunter shot the third bear from the highway. It is possible that the unclaimed illegal kills are the result of bears wandering into fish camps. In spring 2000, a highway vehicle passing close to the dump killed a juvenile male bear.

To prevent the unnecessary and illegal death of bears, Douglas area staff continues to work Yakutat community members and the Alaska Department of Environmental Conservation (ADEC) to remedy landfill problems and curtail brown bear attractants. Over the past year there have been several meetings in Yakutat regarding this issue. We have begun working with the FS to distribute educational materials to Yakutat fish camp permit holders to reduce the possibility of illegal bear kills.

HABITAT

Assessment and Enhancement

We did not conduct any habitat assessment studies or enhancement projects during this report period. The US Forest Service (FS) is presently revising the Situk River Management Plan that may affect brown bear hunting and commercial tourism on the river.

CONCLUSIONS AND RECOMMENDATIONS

Unit 5 male brown bear objectives for skull size were met in both years of this report period. We were unable to determine if we met the age objective for male bears as that information was not yet available. Bears were harvested in a male to female ratio of 4:2 in 1998 and 3.7:2 in 1999, exceeding the 3:2 male to female ratio established as management objectives. We will continue to analyze the age and skull sizes of harvested bears and closely monitor the harvest of breeding-aged female bears. Action taken by the BOG in fall 2000 implementing a registration permit will allow us to assess hunter effort and success.

Yakutat residents view brown bears near town as pests. The Yakutat dump has been an attractant to bears for decades and continues to be a problem, with more than a dozen bears consistently present. We will continue to emphasize to local residents the importance of properly managing garbage and work with ADEC to eliminate this fatal attractant to bears.

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Management Coordinator

.....Table 1 Unit 5 brown bear harvest, age, skull sizes, and effort, 1989–1999

	Harvest				Mean Age			Mean Skull Size		Avg Days/Kill	
Regulatory year	M	F	Unk	Total	M	F	Total	M.....	F	M	F
1989–1990	18	10	1	29	6.6	4.0	5.7	22.8	20.0	3.6	3.6
1990–1991	25	8	2	35	7.9	4.3	6.9	23.2	20.3	5.0	4.0
1991–1992	33	8	0	41	5.3	4.9	5.3	22.4	20.3	5.4	4.3
1992–1993	28	12	0	40	5.0	5.6	5.2	22.2	20.3	4.3	3.8
1993–1994	19	11	0	30	6.7	6.7	6.7	21.3	21.2	3.2	5.6
1994–1995	22	6	0	28	5.5	4.2	5.2	23.0	20.6	4.6	5.7
1995–1996	24	7	0	31	6.7	8.4	7.1	23.5	22.5	4.2	4.0
1996–1997	23	14	1	38	5.4	3.8	4.8	23.1	20.8	4.7	5.6
1997–1998	18	9	0	27	6.1	7.0	6.4	23.4	20.6	4.3	4.3
1998–1999	28	7	0	35	4.2	2.4	3.9[1]	23.5	21.6	4.4	3.0
1999–2000	23	8	0	31	NA	NA	NA	23.5	20.9	5.3	4.4
Means report period	25.5	7.5	0	33	NA	NA	NA	23.5....	21.3	4.9	3.7
1989–97	23.3	9.4	0.4	33.2	6.1	5.4	5.9	22.8	20.7	4.4	4.5

[1] Age data available for fall 1998 only.

Table 2 Unit 5 brown bear harvest chronology, 1989–1999

Regulatory Year	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
1989–1990	0	0	10	3	1	0	0	0	0	5	10	0	29
1990–1991	0	0	15	2	1	0	0	0	0	3	14	0	35
1991–1992	0	0	21	2	0	0	0	0	0	2	16	0	41
1992–1993	0	0	21	5	0	0	0	0	0	3	11	0	40
1993–1994	0	0	7	3	1	1	0	0	0	7	11	0	30
1994–1995	0	0	9	2	0	0	1	0	0	6	10	0	28
1995–1996	0	0	12	1	0	0	0	2	0	7	9	0	31
1996–1997	0	0	21	6	0	0	0	0	0	4	8	0	39
1997–1998	0	0	11	7	0	0	0	0	0	4	5	0	27
1998–1999	0	0	10	10	1	0	0	0	0	4	10	0	35
1999–2000	0	0	10	6	2	0	0	0	0	1	12	0	31

Table 3 Unit 5 successful brown bear hunter residency, 1991–1999

Regulatory year	Local resident	(%)	Nonlocal resident	(%)	Nonresident	(%)
1991–1992						
Fall 1991	3	(7)	3	(7)	17	(41)
Spring 1992	2	(5)	0	(0)	16	(39)
Total	5	(12)	3	(7)	33	(80)
1992–1993						
Fall 1992	2	(5)	4	(10)	20	(50)
Spring 1993	1	(3)	4	(10)	9	(23)
Total	3	(8)	8	(20)	29	(73)
1993–1994						
Fall 1993	1	(3)	3	(1)	8	(27)
Spring 1994	0	(0)	5	(16)	13	(43)
Total	1	(3)	8	(27)	21	(70)
1994–1995						
Fall 1994	1	(4)	1	(4)	9	(32)
Spring 1995	2	(7)	0	(0)	15	(54)
Total	3	(11)	1	(4)	24	(86)
1995–1996						
Fall 1995	1	(3)	0	(0)	12	(39)
Spring 1996	2	(6)	3	(10)	13	(42)
Total	3	(10)	3	(10)	25	(81)
1996–1997						
Fall 1996	1	(3)	6	(16)	19	(50)
Spring 1997	1	(3)	2	(5)	9	(24)
Total	2	(5)	8	(21)	28	(74)
1997–1998						
Fall 1997	1	(4)	4	(15)	13	(48)
Spring 1998	0	(0)	0	(0)	9	(33)
Total	1	(4)	4	(15)	22	(81)
1998–1999						
Fall 1998	2	(6)	5	(14)	14	(40)
Spring 1999	0	(0)	2	(6)	12	(34)
Total	2	(6)	7	(20)	26	(74)
1999–2000						
Fall 1999	2	(6)	1	(3)	15	(49)
Spring 2000	0	(0)	1	(3)	12	(39)
Total	2	(6)	2	(6)	27	(88)

Table 4 Unit 5 transport modes used by successful brown bear hunters, 1991–1999

Regulatory year	Plane	(%)	Boat	(%)	ORV–wheeler	(%)	Highway vehicle	(%)	Foot	(%)	Other	(%)
1991–1992	22	(54)	9	(22)	4	(10)	0	(0)	2	(5)	4	(10)
1992–1993	22	(55)	10	(25)	0	(0)	4	(10)	3	(8)	1	(3)
1993–1993	19	(63)	7	(23)	0	(0)	0	(0)	4	(13)	0	(0)
1994–1995	16	(57)	6	(21)	0	(0)	1	(4)	4	(14)	1	(4)
1995–1996	23	(74)	4	(13)	0	(0)	2	(6)	1	(3)	1	(3)
1996–1997	30	(79)	7	(18)	0	(0)	1	(3)	0	(0)	0	(0)
1997–1998	17	(63)	7	(26)	1	(4)	2	(7)	0	(0)	0	(0)
1998–1999	25	(72)	4	(11)	1	(3)	4	(11)	1	(3)	0	(0)
1999–2000	11	(35)	11	(35)	6	(20)	3	(10)	0	(0)	0	(0)